

NEWLY REQUIRED SUPRAGENERIC NAMES IN VASCULAR PLANTS

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ABSTRACT

Several supra-ordinal names in current use in textbooks and the more technical literature are not validly published. The following are now established: *Cycadidae*, *Cycadophytina*, *Ephedridae*, *Ephedropsida*, *Equisetidae*, *Equisetophytina*, *Ginkgoidae*, *Ginkgoophyta*, *Ginkgoophytina*, *Gnetidae*, *Gnetophyta*, *Gnetophytina*, *Isoetidae*, *Lycopodiophytina*, *Magnoliophyta*, *Magnoliophytina*, *Ophioglossidae*, *Pinophyta*, *Pinophytina*, *Polypodiophytina*, *Psilotidae*, *Psilotophyta*, *Psilotophytina*, *Salviniidae*, *Taxidae*, and *Welwitschiidae*. My own failures in 1992 require formal validation of the superorders *Cornanae*, *Cyclanthanae*, *Loasanae*, *Nepenthanae*, *Primulanae*, *Rafflesianae*, *Sarracenianae*, and *Trochodendranae*. Several ordinal names attributed to G.T. Burnett are invalid as they were proposed at the misplaced rank of section. The following names now in current use are validated: *Acorales*, *Araliales*, *Aspleniales*, *Buxales*, *Calycerales*, *Connarales*, *Hippuridales*, *Nelumbonales*, and *Vitales*. *Cyphocarpaceae*, a provisional family name proposed by Miers in 1848 is in current use; it is now validated. The revelation that *Scrophulariaceae* is polyphyletic requires the acceptance of *Rhinanthaceae* Juss. and recognition of *Schlegeliaceae*.

KEY WORDS: nomenclature, Magnoliophyta

When the three great workers on higher plant phylogeny and nomenclature, Cronquist, Takhtajan, and Zimmermann (1966), joined forces to promote a new system of classification for plants and the use of generic stems throughout all ranks above that of genus, they established a new era of botanical nomenclature for these oft used but rarely fully evaluated names. It was therefore a surprise to discover that several of their, and others (*e.g.*, Tippe 1942; Bold 1957; Ehrendorfer 1971) now commonly used names were not validly published. In all instances noted here, the authors failed to provide a full and direct reference to a Latin description or diagnosis (Art. 36.1; Greuter *et al.* 1994). Many of the names proposed as new by the three were validated earlier by others, most notably Bessey (1907, 1910) and Boivin

(1956); of course, several of the names proposed in 1966 are valid. Nonetheless, the following require validation:

Cycadidae Reveal, *subclass nov.*, validated by a reference to the Latin diagnosis of a J.R.B. Boivin (Bull. Soc. Bot. France 103:493. Dec 1956) isonym of class Cycadopsida A.T. Brongniart (*Enum. Pl. Mus. Paris* xxxii, 136. 12 Aug 1843, as Cycadoideae, validated by a diagnosis in French).

Cycadophytina Cronquist, Takht., & Zimmerm. *ex* Reveal, *subdiv. nov.*, validated by a reference to the Latin diagnosis of a later J.R.B. Boivin (Bull. Soc. Bot. France 103:493. Dec 1956) isonym of Class Cycadopsida A.T. Brongniart (*Enum. Pl. Mus. Paris* xxxii, 136. 12 Aug 1843, as Cycadoideae, validated by a diagnosis in French).

Ephedridae Cronquist, Takht., & Zimmerm. *ex* Reveal, *subclass nov.*, validated by a reference to a H.G.L. Reichenbach (*Fl. Germ. Excurs.* 1(2):156. Jan-Apr 1831, as Tribe Ephedreae) name with a diagnosis in Latin.

Ephedropsida Reveal, *class nov.*, validated by a reference to a H.G.L. Reichenbach (*Fl. Germ. Excurs.* 1(2):156. Jan-Apr 1831, as Tribe Ephedreae) name with a diagnosis in Latin.

Equisetidae Reveal, *subclass nov.*, validated by a reference to a J.R.B. Boivin (Bull. Soc. Bot. France 103:493. Dec 1956, as Division Equisetophyta ["Equisophyta"]) name with a diagnosis in Latin.

Equisetophytina Reveal, *subdiv. nov.*, validated by a reference to a J.R.B. Boivin (Bull. Soc. Bot. France 103:493. Dec 1956, as Division Equisetophyta ["Equisophyta"]) name with a diagnosis in Latin.

Ginkgoophyta Bold *ex* Reveal, *div. nov.*, validated by a reference to a J.R.B. Boivin (Bull. Soc. Bot. France 103:493. Dec 1956, as Class Ginkgoopsida) name with a diagnosis in Latin.

Ginkgoophytina Cronquist, Takht., & Zimmerm. *ex* Reveal, *subdiv. nov.*, validated by a reference to a J.R.B. Boivin (Bull. Soc. Bot. France 103:493. Dec 1956, as Class Ginkgoopsida) name with a diagnosis in Latin.

Gnetidae Cronquist, Takht., & Zimmerm. *ex* Reveal, *subclass nov.*, validated by a reference to a J.R.B. Boivin (Bull. Soc. Bot. France 103:494. Dec 1956, as Class Gnetopsida) name with a diagnosis in Latin.

Gnetophyta Bold *ex* Reveal, *div. nov.*, validated by a reference to a J.R.B. Boivin (Bull. Soc. Bot. France 103:494. Dec 1956, as Class Gnetopsida) name with a diagnosis in Latin.

Gnetophytina Cronquist, Takht., & Zimmerm. *ex* Reveal, *subdiv. nov.*, validated by a reference to the Latin diagnosis of a later J.R.B. Boivin (Bull. Soc. Bot. France 103:494. Dec 1956) isonym of Class Gnetopsida H.G.A. Engler (*Nat. Pflanzenfam.*, II, 1:2. 26 Mar 1887, as Gnetales, validated by a diagnosis in German).

Isoetidae Reveal, *subclass nov.*, validated by a reference to a Latin diagnosis associated with a later J.R.B. Boivin (Bull. Soc. Bot. France 103:493. Dec 1956, as *Isopsida*) isonym of Class *Isoetopsida* H.G.A. Engler (in H.G.A. Engler & K.A.E. Prantl, *Die Pflanzenfam. Nachtr.*: 5. July 1897 with a diagnosis in German).

Lycopodiophytina O. Tippe *ex* Reveal, *subdiv. nov.*, validated by a reference to a F.G. Bartling (*Ord. Nat. Pl.*: 14, 19. Sep 1830, as Class *Lycopodiopsida* ["*Lycopineae*"]) name with a description in Latin.

Magnoliophyta Cronquist, Takht., & Zimmerm. *ex* Reveal, *div. nov.*, validated by a reference to a C.A. Agardh (Classes Pl. [2:] 13. 1825, as Class *Polycarpellae*) name with a description in Latin.

Magnoliophytina D. Frohne & U. Jensen *ex* Reveal, *subdiv. nov.*, validated by a reference to a C.A. Agardh (Classes Pl. [2:] 13. 1825, as Class *Polycarpellae*) name with a description in Latin.

Ophioglossidae Takht. *ex* Reveal, *subclass nov.*, validated by a reference to a rankless R. Brown (*Prodr.*: 136. 27 Mar 1810, as *Ophioglosseae*) name with a diagnosis in Latin.

Pinophyta Cronquist, Takht., & Zimmerm. *ex* Reveal, *div. nov.*, validated by a reference to a F.G. Bartling (*Ord. Nat. Pl.*: 90, 92. Sep 1830, as Class *Coniferae*) name with a description in Latin.

Pinophytina Cronquist, Takht., & Zimmerm. *ex* Reveal, *subdiv. nov.*, validated by a reference to a F.G. Bartling (*Ord. Nat. Pl.*: 90, 92. Sep 1830, as Class *Coniferae*) name with a description in Latin.

Polypodiophytina Reveal, *subdiv. nov.*, validated by a reference to a J.R.B. Boivin (Bull. Soc. Bot. France 103:494. Dec 1956, as *Subdiv. Pteridophytina* ["*Pterophytina*"]) name with a diagnosis in Latin.

Psilotidae Reveal, *subclass nov.*, validated by a reference to the Latin description of a later T. Nakai (*Chosakuronbun Mokuroku* [*Ord. Fam. Trib. Nov.*]: 206. 20 Jul 1943) isonym of Order *Psilotales* H.G.A. Engler (in H.G.A. Engler & K.A.E. Prantl, *Nat. Pflanzenfam. Nachtr.* 1:5. Jul 1897 with a diagnosis in German).

Psilotophyta B. Boivin *ex* Reveal, *div. nov.*, validated by a reference to the Latin description of a later T. Nakai (*Chosakuronbun Mokuroku* [*Ord. Fam. Trib. Nov.*]: 206. 20 Jul 1943) isonym of Order *Psilotales* H.G.A. Engler (in H.G.A. Engler & K.A.E. Prantl, *Nat. Pflanzenfam. Nachtr.* 1:5. Jul 1897 with a diagnosis in German).

Psilotophytina O. Tippe *ex* Reveal, *subdiv. nov.*, validated by a reference to the Latin description of a later T. Nakai (*Chosakuronbun Mokuroku* [*Ord. Fam. Trib. Nov.*]: 206. 20 Jul 1943) isonym of Order *Psilotales* H.G.A. Engler (in H.G.A. Engler & K.A.E. Prantl, *Nat. Pflanzenfam. Nachtr.* 1:5. Jul 1897 with a diagnosis in German).

Salviniidae Pic. Serm. *ex* Cronquist, Takht., & Zimmerm. *ex* Reveal, *subclass nov.*, validated by a reference to the Latin description associated with the type genus by M. Adanson (*Gen. Pl.* 2:15. Jul-Aug 1764).

Taxidae F. Ehrendorfer *ex* Reveal, *subclass nov.*, validated by a reference to the Latin description of the type genus given by S.L. Endlicher (*Syn. Conif.*: 242. Mai-Jun 1847).

Welwitschiidae Cronquist, Takht., & Zimmerm. *ex* Reveal, *subclass nov.*, validated by a reference to a J.R.B. Boivin (*Bull. Soc. Bot. France* 103:494. Dec 1956, as Class Welwitschiopsida ["Welwopsidia"]) name with a diagnosis in Latin.

My own failure (Reveal 1992) to provide a reference to a validating Latin description or diagnosis means that several superordinal names are not available.

Cornanae Thorne *ex* Reveal, *superord. nov.*, validated by a reference to a S.L. Endlicher (*Gen. Pl. Suppl.* 5:17. 1850, as Subfam. Cornoideae ["Corneae"]) name with a diagnosis in Latin.

Cyclanथanae Thorne *ex* Reveal, *superord. nov.*, validated by a reference to a F.G. Bartling (*Ord. Nat. Pl.*: 67. Sep 1830, as Tribe Cyclantheae ["Cyclanthea"]) name with a diagnosis in Latin.

Loasanae R. Dahlgren *ex* Reveal, *superord. nov.*, validated by a reference to a P.F. Horaninow (*Char. Ess. Fan.*: 147. 1847, as Tribe Loaseae) name with a description in Latin.

Nepenthanae Takht. *ex* Reveal, *superord. nov.*, validated by a reference to a J.H.F. Link (*Handbuch* 1:369. Jan-Aug 1829, as Subfam. Nepenthoideae ["Nepenthinae"]) name with a diagnosis in Latin.

Primulanae R. Dahlgren *ex* Reveal, *superord. nov.*, validated by a reference to a A.J.G.C. Batsch (*Tab. Regni Veg.*: 206. 2 Mai 1802, as Order Cyathinae) name with a description in Latin.

Rafflesianae Thorne *ex* Reveal, *superord. nov.*, validated by a reference to a description in Latin for the Tribe Rafflesieae H.W. Schott & S.L. Endlicher *ex* E. Spach (*Hist. Nat. Vég.* 10:551. 20 Mar 1841, as "Rafflesiaceae") given by R. Brown (*Trans. Linn. Soc. London* 19:242. 6 Nov 1844).

Sarracenianae Thorne *ex* Reveal, *superord. nov.*, validated by a reference to the Latin description of Sarraceniaceae given by G. Bentham & J.D. Hooker (*Gen. Pl.* 1:48. 7 Aug 1862).

Trochodendranae Takht. *ex* Reveal, *superord. nov.*, validated by a reference to an A.L. Takhtajan *ex* A.J. Cronquist (*Integr. Syst. Class. Fl. Pl.*: 157. 10 Aug 1981, as Order Trochodendrales) name with a description in Latin.

In reviewing other suprageneric names of vascular plants I discovered that several names proposed by G.T. Burnett in 1835 and previously considered to have been validly published at the rank of order (Cronquist 1981; Reveal 1993), are invalid as they were proposed at the misplaced rank of section (Art. 33.5; Greuter *et al.* 1994). The following names, now in current use, are validated.

Acorales Reveal, *ord. nov.*, validated by a reference to a J.H.F. Link (*Handb.* 1:144. Jan-Aug 1829, as Subfam. Acoroideae ["Acorinae"]) name with a description in Latin.

Araliales Hutch. *ex* Reveal, *ord. nov.*, validated by a reference to an A.L. de Jussieu (*Gen. Pl.*: 217. 4 Aug 1789, as Fam. Araliaceae ["Araliae"]) name with a description in Latin.

Aspleniales Pic. Serm. *ex* Reveal, *ord. nov.*, validated by a reference to a C.B. Presl (Abh. Königl. Böhm. Ges. Wiss., ser. 4, 5:91. 2 Dec 1836, as Tribe Aspleneae ["Aspleniaceae"]) name with a description in Latin.

Buxales Takht. *ex* Reveal, *ord. nov.*, validated by a reference to the Latin diagnosis given by F.G. Bartling (*Ord. Nat. Pl.*: 370. Sep 1830, as "Buxea") for the Tribe Buxeeae Dumort. (*Comment. Bot.* xx. 1822).

Calycerales Takht. *ex* Reveal, *ord. nov.*, validated by a reference to a R. Brown *ex* L.C.M. Richard (Mém. Mus. Hist. Nat. 6:74. Nov 1820, as Fam. Calyceraceae ("Calycereae")) name with a description in Latin.

Connarales Takht. *ex* Reveal, *ord. nov.*, validated by a reference to an A.P. de Candolle (*Prodr.* 2:84. mid Nov 1825, as Tribe Connareae) name with a description in Latin.

Hippuridales Pulle *ex* Reveal, *ord. nov.*, validated by a reference to a J.H.F. Link (*Enum. Hort. Berol. Alt.* 1:5. 16 Mar-30 Jun 1821, as Fam. Hippuridaceae ["Hippurideae"]) name with a description in Latin.

Nelumbonales Nakai *ex* Reveal, *ord. nov.*, validated by a reference to an A.P. de Candolle (*Syst. Nat.* 2:43. late Mai 1821, as Tribe Nelumboneae) name with a description in Latin.

Vitales Takht. *ex* Reveal, *ord. nov.*, validated by a reference to an A.L. de Jussieu (*Gen. Pl.*: 267. 4 Aug 1789, as Fam. Vitaceae ["Vites"]) name with a description in Latin.

In preparing the list of family names for consideration under the rubric "NCU" (Hoogland & Reveal 1993), we failed to note that Cyphocarpaceae was a provisional name and thus not validly published (Art. 34.1[b]; Greuter *et al.* 1994). In order that this name may continue in use, as was our intent in 1993, it is validated here.

Cyphocarpaceae (Miers) Reveal & Hoogland, *stat nov.*, based on Subfam. Cyphocarpoideae Miers, London J. Bot. 7:61. 1848, as Cyphocarpaceae.

One goal of systematics is to recognize monophyletic taxa. The recent discovery (Olmstead & Reeves 1995) that Scrophulariaceae, as defined by most modern workers, is polyphyletic requires a redefinition of that family. Two approaches can be taken, the reduction of numerous commonly accepted families to synonymy under a single, broadly defined Scrophulariaceae, or a fragmentation of the family into smaller groups reminiscent of the family treatments proposed by Jussieu (1789) and subsequent early nineteenth century authors. In reviewing the options, I have decided to take the latter course and propose the following linear sequence within a broadly defined Scrophulariales:

Scrophulariales Lindl. (1833)

- Acanthales Lindl. (1833)
- Bignoniales Lindl. (1833)
- Gesneriales Dumort. (1829)
- Globulariales Dumort. (1829)
- Lentibulariales Lindl. (1833)
- Pinguiculariales Dumort. (1829)
- Plantaginales Lindl. (1833)
- Rhinanthales Dumort. (1829)
- Vertrales Dumort. (1829)

1. Buddlejaceae K. Wilh. (1910)
2. Retziaceae Bartl. (1830)
3. Stilbaceae Kunth, *nom. cons.* (1831)
4. Bignoniaceae Juss., *nom. cons.* (1789)
 - Crescentiaceae Dumort. (1829)
5. Paulowniaceae Nakai (1949)
6. Schlegeliaceae Reveal (1996)
7. Verbasaceae Raf. (1821)
8. Scrophulariaceae Juss., *nom. cons.* (1789)
 - Antirrhinaceae Pers. (1807)
 - Caprariaceae Martinov (1820)
 - Chelonaceae Martinov (1820)
 - Gratiolaceae Martinov (1820)
 - Limosellaceae J. Agardh (1858)
 - Linariaceae Martinov (1820)
 - Oxycladaceae (Miers) Schnizl. (1843-1870)
9. Rhinanthaceae Vent., *nom. cons. prop.* (1799)
 - Aragoaceae D. Don (1835)
 - Buchneraceae (Benth.) Lilja (1870)
 - Digitalidaceae Martinov (1820)
 - Erinaceae Duvau *ex Pfeiff.* (1873)
 - Euphrasiaceae Martinov (1820)
 - Melampyraceae Rich. *ex Hook. & Lindl.* (1821)
 - Pedicularidaceae Juss. (1789)
 - Sibthorpiaceae D. Don (1835)
 - Veronicaceae Durande (1782)
10. Oftiaceae Takht. & Reveal (1993)
 - Spielmanniaceae J. Agardh, *nom. illeg.* (1858)
11. Ellisiophyllaceae Honda (1930)
12. Orobanchaceae Vent., *nom. cons.* (1799)

- Aeginetiaceae Livera (1927)
 Phelypaeaceae Horan. (1834)
 13. Selaginaceae Choisy, *nom. cons.* (1823)
 Hebenstretiaceae Horan. (1834)
 14. Globulariaceae DC., *nom. cons.* (1805)
 15. Gesneriaceae Dumort., *nom. cons.* (1822)
 Belloniaceae Martinov (1820)
 Besleriaceae Raf. (1838)
 Cyrtandraceae Jack (1823)
 Didymocarpaceae D. Don (1822)
 Ramondaceae Godr. (1850)
 16. Plantaginaceae Juss., *nom. cons.* (1789)
 Littorellaceae Gray (1821)
 Psylliaceae Horan. (1834)
 17. Pedaliaceae R. Br., *nom. cons.* (1810)
 Sesameaceae R. Br. *ex Bercht.* & J. Presl (1820)
 18. Martyniaceae Stapf, *nom. cons.* (1895)
 19. Trapellaceae Honda & Sakisaka (1930)
 20. Myoporaceae R. Br., *nom. cons.* (1810)
 Bontiaceae Horan. (1834)
 21. Acanthaceae Juss., *nom. cons.* (1789)
 Justiciaceae Raf. (1838)
 Mendonciaceae Bremek. (1954)
 Meyeniaceae Sreem. (1977)
 Nelsoniaceae (Nees) Sreem. (1977)
 Thomandersiaceae Sreem. (1977)
 Thunbergiaceae (Dumort.) Lilja (1870)
 22. Lentibulariaceae Rich., *nom. cons.* (1808)
 Pinguiculaceae Dumort. (1829)
 Utriculariaceae Hoffmanns. & Link, *nom. cons.* (1809)

All names necessary for the proposed revision of Scrophulariales are available except for the following:

Schlegeliaceae (Gentry) Reveal, *fam. & stat. nov.*, based on Tribe Schlegelieae Gentry, Fl. Neotrop. Monogr. 25:48. 19 Sep 1980.

The problematic relationship of *Schlegelia*, *Gibsoniothamnus*, and *Synopsis* with Bignoniaceae and Scrophulariaceae is well known (Monachino 1949; Williams 1970; Gentry 1980; Armstrong 1985). With the discovery of a fourth genus, *Exarata* (Gentry 1992), the distinctiveness of the taxon has become clear, and its nearness to Bignoniaceae confirmed. The fragmentation of Scrophulariaceae, the mandatory recognition of Paulowniaceae, and the unique position of the genera related to *Schlegelia* in the data presented by Olmstead & Reeves (1995) requires the recognition of Schlegeliaceae as a distinct family. Failure to fragment the traditional Scrophulariaceae into smaller families would mean that recognition of Oftiaceae, Ellisiophyllaceae, Orobanchaceae, Selaginaceae, and Globulariaceae is impossible, Bignoniaceae becomes doubtful, and the continued recognition of Pedaliaceae, Martyniaceae, Trapellaceae, Myoporaceae, and even Plantaginaceae dubious. Even the

continued acceptance of Gesneriaceae renders a broadly defined Scrophulariaceae paraphyletic.

The family name Rhinanthaceae (1799) will be proposed for conservation against the earlier Veronicaceae (1782) as the former was widely accepted in the early literature and its generic stem is the basis for Subfam. Rhinanthoideae Link.

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